A Statewide Assessment of BLM-Managed Streams and Rivers in Idaho

Objectives

The Bureau of Land Management (BLM) compiled baseline assessment, inventory, and monitoring (AIM) data from 2013 to 2016 to report on the condition of BLM-managed wadeable streams and rivers in Idaho. The objectives of the assessment were to:

1. Determine baseline chemical, physical, and biological conditions for Idaho-managed stream systems from which trends can be assessed.

2. Assess attainment of Idaho standards for rangeland health for stream systems.

3. Identify and rank the stressors contributing to degraded stream conditions where standards are not attained.

Summary of Findings

BLM-managed wadeable streams and rivers in Idaho were in **moderate to good condition overall**

Potential concerns to be further addressed include nutrient loading, streambank conditions, and biological condition as indicated by macroinvertebrates

Over one-third had degraded biological condition, and excessive nutrient loading and fine sediment are widespread contributors to observed biological conditions
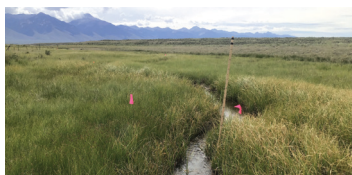
One-third had less bank stability and **nearly one-half had less canopy cover** than their desired condition, but neither condition significantly impacted biological condition

The National Hydrography Dataset (NHD) **overestimated kilometers of BLM-managed perennial streams and rivers by 38%.**

Methods

The BLM assessed 65 random sample reaches from probability-based survey designs using 10 indicators that collectively address four of the Idaho standards for rangeland health. For each indicator, the team established benchmarks specified by policy or based on data collected at existing monitoring networks of least disturbed "reference" reaches. Benchmarks based on reference networks used empirical models to determine reach-specific predicted natural conditions or quantified the range of variability among reference reaches by ecoregion and stream size. Networks of reference reaches varied by indicator.

Data collection followed the "National Aquatic Monitoring Framework: Field Protocol for Wadeable Lotic Systems" as part of the AIM strategy. By using random sample reaches and identical field methods, the BLM could combine reaches to report on the condition of wadeable streams in Idaho with known levels of precision and confidence.
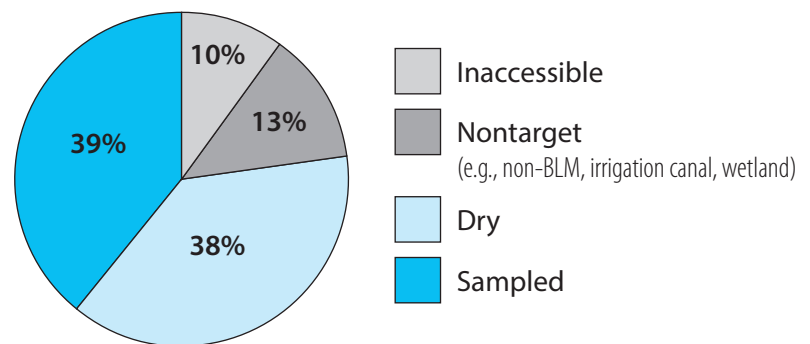

Distribution of Sample Reaches
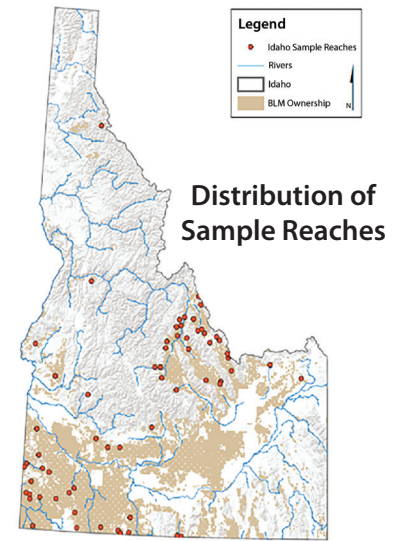
Results

The assessment found that only 2,395 km of the originally estimated 6,085 km of BLM-managed wadeable streams were actually perennial during the period of study. The rest were nonperennial, outside of the target group for other reasons, or inaccessible. The observed dry reaches did not appear to be related to anthropogenic activities such as hydrological alterations but reflect NHD mapping errors or changing climatic conditions.

For each of the 10 indicators used in the assessment, the BLM reported the relative extent—the extent of BLM-managed wadeable streams in Idaho meeting or not meeting benchmarks—with a ±90% confidence interval. Relative extent results show how pervasive a stressor is throughout the state. The BLM also reported the relative risk—a measure of the potential impacts of conditions assessed by each indicator to macroinvertebrate biological condition. Relative risk results show what the presence of a stressor means to a beneficial use designated by the state of Idaho, with larger values associated with higher impacts.

Total Estimated Stream Kilometers
(National Hydrography Dataset)

- Inaccessible
- Nontarget (e.g., non–BLM, irrigation canal, wetland)
- Dry
- Sampled

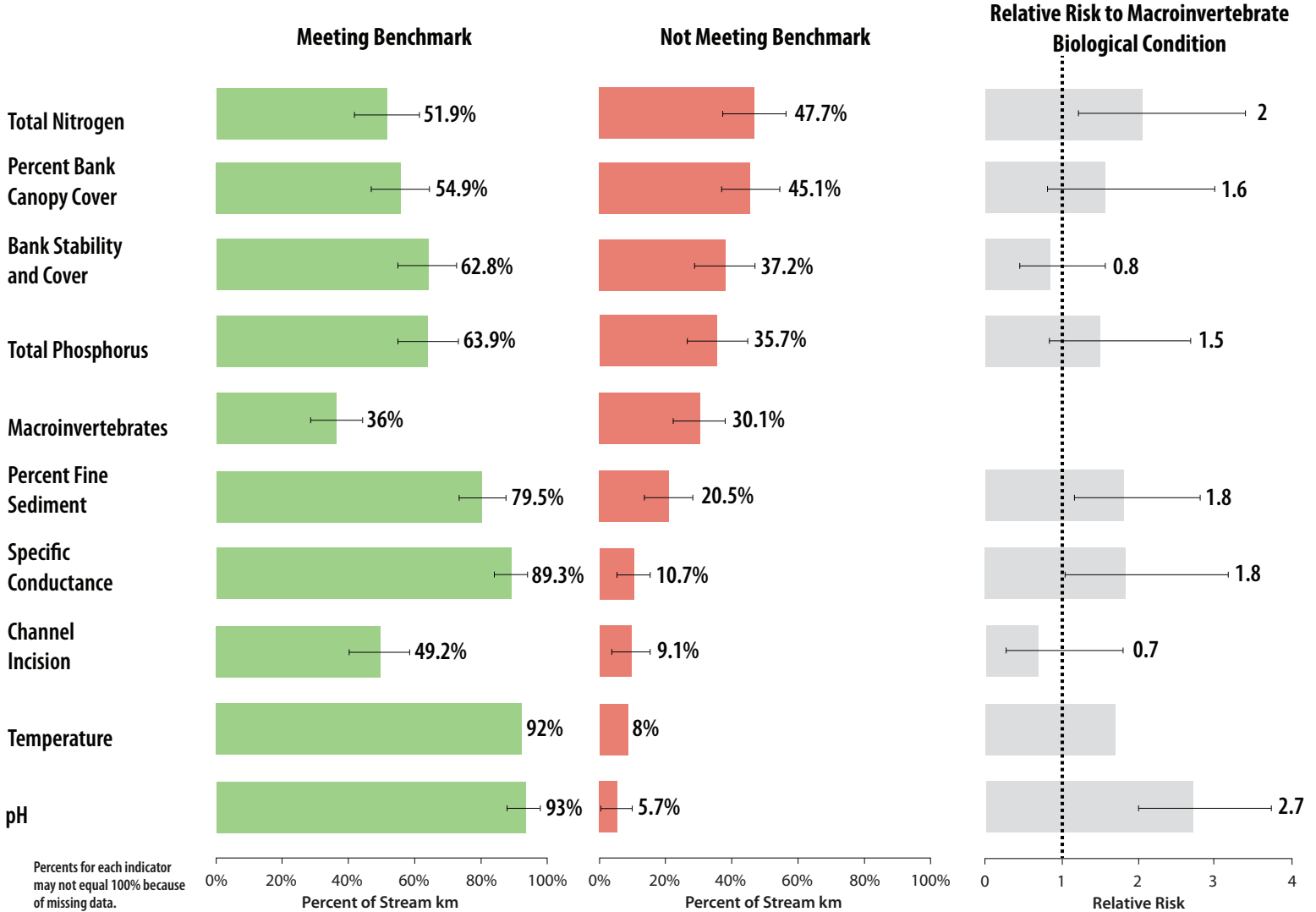|		
Water Quality Indicators *Idaho Standard 7: Water Quality*		
Temperature	**Method:** NA – mean August stream temperature derived from NorWesST	**Results:** >90% of stream km met benchmark
	Benchmark: Predicted value ≤ Idaho Department of Environmental Quality (DEQ) standard of 19 °C for cold-water biota	
pH	**Method:** In situ multiparameter sonde	**Results:** >90% of stream km met benchmark; isolated instances associated with degraded macroinvertebrate biological integrity
	Benchmark: Observed value ≥6.5 standard units (SU) and ≤9 SU	
Specific Conductance	**Method:** In situ multiparameter sonde	**Results:** Nearly 90% of stream km met benchmark; isolated instances associated with degraded macroinvertebrate biological integrity
	Benchmark: Observed value ≤ PNC plus 95th percentile of model error (74.5 µS/cm)	
Total Nitrogen	**Method:** Single grab sample for lab analysis	**Results:** Only 52% of stream km met benchmark; associated with significant risk of degraded macroinvertebrate biological integrity
	Benchmark: Observed value ≤ PNC plus 95th percentile of model error (114.7 µg/L)	
Total Phosphorus	**Method:** Single grab sample for lab analysis	**Results:** Only 64% of stream km met benchmark; associated with significant risk of degraded macroinvertebrate biological integrity
	Benchmark: Observed value ≤ PNC plus 95th percentile of model error (21.3 µg/L)	
Macro-invertebrates	**Method:** Eight composite Surber samples from riffle habitats or multihabitat sampling consisting of 11 composite Surbers	**Results:** Showed the most departure from reference; just over one-third met benchmark
	Benchmark: Observed value >0.68 based on PIBO observed/expected (O/E) macroinvertebrate model	
Riparian and Instream Function Indicators *Idaho Standard 2: Riparian Areas and Wetlands, Standard 3: Stream Channel/Floodplain, and Standard 8: Threatened and Endangered Plants and Animals*		
Percent Fine Sediment	**Method:** Ten particles from each of 21 transects from active channel	**Results:** Nearly 80% of stream km met benchmark when present, associated with significant risk of degraded macroinvertebrate biological integrity
	Benchmark: N. Rockies: Observed value ≤29% for small streams and 15% for large streams; N. Xeric Basins: Observed value ≤45% for small streams and 44% for large streams	
Bank Cover and Stability	**Method:** Left and right bank at 21 transects	**Results:** Nearly 63% of stream km met benchmark
	Benchmark: Observed value >80% for both bank stability and cover based on Idaho BLM policy	
Percent Bank Canopy Cover	**Method:** Left and right bank at 11 transects with densiometer	**Results:** >50% of stream km met benchmark; associated with degraded macroinvertebrate biological integrity
	Benchmark: N. Rockies: Observed value >76.5% for small streams and 61% for large streams; N. Xeric Basins: Observed value >69% for small streams and 55% for large streams	
Channel Incision	**Method:** Bankfull and floodplain heights at 11 transects	**Results:** Nearly 50% of stream km met benchmark
	Benchmark: N. Rockies: Observed value ≤0 for small streams and 0.01 for large streams; N. Xeric Basins: Observed value ≤0.09 for small streams and 0.11 for large streams	

Indicators

	Meeting Benchmark	**Not Meeting Benchmark**	**Relative Risk to Macroinvertebrate Biological Condition**
Total Nitrogen	51.9%	47.7%	2
Percent Bank Canopy Cover	54.9%	45.1%	1.6
Bank Stability and Cover	62.8%	37.2%	0.8
Total Phosphorus	63.9%	35.7%	1.5
Macroinvertebrates	36%	30.1%	
Percent Fine Sediment	79.5%	20.5%	1.8
Specific Conductance	89.3%	10.7%	1.8
Channel Incision	49.2%	9.1%	0.7
Temperature	92%	8%	
pH	93%	5.7%	2.7

Percents for each indicator may not equal 100% because of missing data.

Meeting Benchmark: Percent of Stream km (0% – 100%)
Not Meeting Benchmark: Percent of Stream km (0% – 100%)
Relative Risk (0 – 4)

Next Steps

The BLM must track changes in chemical, physical, and biological conditions of streams by repeating this survey to identify trends and determine the effectiveness of management changes over time. The BLM's Idaho Falls, Twin Falls, and Coeur d'Alene Districts are implementing field office-scale monitoring projects that will provide data to help understand causes for observed conditions.

The BLM's next step is to identify land uses associated with priority stressors and degraded biological condition, and specifically, to determine the extent to which BLM permitted activities are causal factors in the observed departures from land health standards. The BLM will use this information to identify best management practices, strengthen collaborations with state and federal partners to improve watershed health, and ensure the productivity and sustainability of BLM rangelands and permitted activities.

Concurrently, BLM needs to continue to work with the USGS and others to refine the NHD stream layer to address the misclassification of streams. In addition, the BLM should participate in monitoring changes in flow periodicity among systems.